PUBLISHED QUARTERLY BY UTAH GEOLOGICAL AND MINERAL SURVEY

SURVEY NOTES

Vol. 14 No. 1 | Service to the State of Utah | February 1980

RESOURCES AND PUBLIC POLICY

by William W. Hambleton[1]

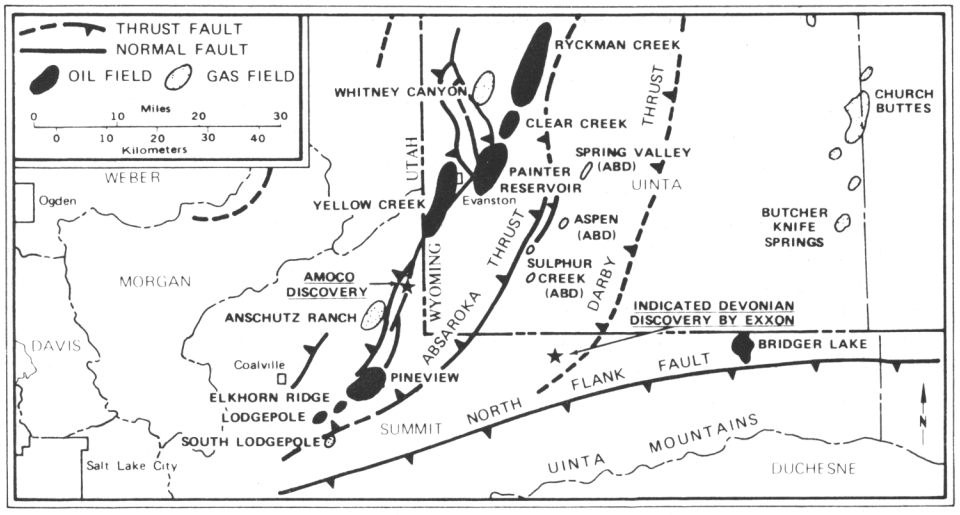
(This brief history of ownership of water and oil in the western United States and changes in public policy is adapted from W. W. Hambleton's original article.)

The United States is virtually the only country in the world where the landowner also owns the mineral rights. The state or the Crown hold all mineral resources in most countries. One should not become too complacent about this idea, for the federal government holds ownership of approximately 830 million acres, an area equal roughly to that part of the continental United States east of the Mississippi River. Furthermore, an estimated 73 percent of that public land has been withdrawn from mineral exploration by a number of Congressional actions, including the Endangered Species Act and the Wilderness Act. Nevertheless, the concept of private ownership of resources in the United States was well established from English common law.

However, federal and state governments hold powers that constrain private ownership of resources. Specific authority reserved to the federal government under the Constitution derives from the supremacy clause, power to regulate interstate commerce, war powers, the taking of property, and taxing and spending powers. Executive agencies of the federal government have further quasi-legislative functions that require

(continued on page 2)

[1] Director, Kansas Geological Survey. Reprinted by permission from *The Journal*, vol. 1, no. 5, p. 1-6, 1979.



Recent oil discoveries in Summit County, Utah.

THRUST BELT OIL AND GAS DISCOVERY MAY PROMISE NEW MAJOR FIELD

Discovery hopes for new oil and gas in Utah's Thrust Belt were boosted by announcement in early January of successful completion of a new Nugget Sandstone discovery in Summit County, Utah. The well, Amoco No. 1 Bountiful Livestock, NW SW sec. 16, T. 4 N., R. 8 E., flowed 240 barrels of oil and one million cubic feet of gas from perforations at 13,400 to 13,430 feet. The well is about 2,000 feet west of the Wyoming-Utah boundary and about five miles northeast of the developing Anschutz Ranch field. The discovery is between Anschutz Ranch and Yellow Creek field in adjacent Uinta County, Wyoming. To the south on the same trend is the giant Pineview field, the opening discovery of oil in the Utah-Wyoming Thrust Belt. Since the Pineview find in 1975, Utah's discovery record has been modest in contrast to the discovery of numerous giant and major fields only a short distance north and northeast in adjacent

(continued on page 3)

DEVONIAN YIELDS OIL – A FIRST

Another significant discovery appears to have been made at Exxon No. 1 Mill Creek Unit - Federal, SE NE section 27, T. 3 N., R. 10 E., Summit County. This well tested 45° gravity oil and gas at 11,450 to 11,609 feet from the Three Forks Formation (Devonian), the first Devonian oil in Utah's portion of the Thrust Belt. The well is located 20 miles east of the Pineview field near the intersection of the Darby Thrust Fault and the North Flank Fault on the north flank of the Uinta Mountain Uplift. Exxon deepened the well to below 11,900 feet in the Jefferson Dolomite, also Devonian, and has now set casing to 11,902 feet for testing and possible production.

IN THIS ISSUE

PUBLIC POLICY

(continued from page 1)

rule making. Agencies are subject to the general principle that Congress can write laws delegating power to them, but cannot delegate power to write laws.

The powers of the states include police power relating to health, peace, morals, education, good order, and the general welfare. Conservation of resources falls under the general welfare and health and safety doctrines, subject to due process and equal protection. Further powers include taxation and procurement, and the taking of private property by eminent domain and escheat. Extra-territorial powers relate to the state as a representative of its citizens, known as *parens patriae*, and the ability to enter interstate agreements and compacts, subject to the approval of Congress. Comparison of how public policy developed with respect to groundwater and to oil and gas is instructive.

Groundwater (policy of scarcity)

Under police powers, water laws were some of the first laws adopted by the states. These were patterned on the riparian, or common law, doctrine of England. Except for navigational waters, all waters of England were privately held, and each owner of riparian land, that is land along a river, owned the bed of the stream that crossed his land, and was entitled to have the stream continue to flow in its natural condition. The owner could make certain uses of the water while it was upon his land, so long as the stream remained undiminished in quantity and quality when it left his land. All of the states west of the 95th Meridian, which lies approximately at the eastern border of Kansas, have declared the surface waters within their boundaries to be the property of the people of the state. Interestingly, Congress has consented to this arrangement by ratification of state constitutions.

However, at the time state constitutions and early laws were written, there was little awareness of groundwater, the water occurring in the little spaces between other things below the surface of the ground. Some states adopted the common law or prior-appropriation doctrines for groundwater. Other states, including a number of the western states, applied the doctrine of absolute ownership of groundwater, drawing upon the kind of ownership associated with minerals.

Although the concept is based upon a scarcity of water, the appropriation doctrine was satisfactory as long as demands upon the groundwater were not too great. However, things are different today. Public policy is moving in a direction of increased regulation, importation, and water conservation–meaning the avoidance of waste–as the only alternatives to dry-land farming. The terms "regulation," "conservation," and "importation" should have a familiar ring for those who are associated with the petroleum industry. The only difference is that alternative energy sources are available to replace petroleum, whereas there are no substitutes for water. There is increasing recognition that groundwater moves across state lines, and that there are interconnections between groundwater and surface water. The federal government, under its commerce clause powers, is looking to new national policy options that could enable it to manage this scarcity.

Oil and Gas (policy of abundance)

Now let's look at public policy with respect to oil and gas, noting that policy developed because of overabundance. Ownership is based on mining law, and the courts generally agreed that oil and gas in place are minerals, and are part of the land. When oil and gas are brought to the surface and reduced to actual possession, they are considered personal property in Kansas. This kind of ownership derives from the Rule of Capture, which grew out of the recognition that oil and gas are fugacious. In other words, you only own it if you can get it. The law recognized that oil and gas might move from underneath an owner's land naturally or because of an adjacent landowner's production. During the infancy of the oil and gas industry, beginning in the late 1800s, there was little other public policy. Oil and gas had little use and they did not flow on the surface. Hence, there was no need for a riparian doctrine. Not enough oil and gas were produced to cause concern about air or water pollution.

The public interest was recognized first during the early 1900s when some states began to forbid waste. However, the public interest really was aroused with the discovery of the great East Texas Field in 1929. So much oil flowed in commerce and on the ground that the price dropped to five cents a barrel. Some industry members even attempted to ameliorate economic dislocation by suggesting federal control.[1] Oppostion was strong enough that a compromise resulted in the formation of the Interstate Oil Compact Commission in 1935. The Commission had no powers, but produced much model legislation at the state level relating to prevention of waste. Not only were conservation practices legislated, but prices were stabilized. Notice again that the public interest related to overabundance rather than scarcity. Following soon were protection of correlative property rights, maximum efficient rates of production, well spacing and unitization, and ratable taking. Protection of fresh water, especially groundwater, occupied the public interest, as did disposal of the large amounts of brine produced with oil and gas.

A depletion allowance, again deriving from mining tax-law, has been characteristic of both state and federal taxes with respect to the oil and gas industry. Philosophically, the depletion allowance recognized the need for accumulation of capital as a resource is depleted, in order that a new resource might be found and developed. Also

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[1] John G. Clark (Department of History, University of Kansas), in a study of federal responses to energy crises during 1919-1924 and 1973-1975, notes that a U. S. crude-oil deficit peaked in 1920 at 88 million barrels, or 17 percent of total consumption. Although importation of Mexican crude closed the gap, President Coolidge appointed the Federal Oil Conservation Board, which promulgated conservation mechanisms including unit management of oil fields, prorationing of daily allowables, and negotiation of implementation measures with producing states. Ironically, the FOCB, which was not abolished until 1934, responded to the vast over-production of the early 1930s by urging with renewed vigor the adoption of the same policies advocated earlier as a hedge against scarcity (personal communication). Professor Clark's study should bring interesting new insights to this little-known period in the history of petroleum production.

present in tax law are the severance and ad valorem taxes, which recognize that a resource of value has been produced for resale.

The federal interest originally was constrained to leasing on public lands, to the exercise of the interstate commerce clause with respect to interstate transportation, and to antitrust actions relating to monopoly operations.

In 1906, the Hepburn Act created the Interstate Commerce Commission, wherein pipelines were regulated as common carriers in the interstate transportation of oil and gas. This was relatively innocuous regulation, and was concerned largely with approval of pipeline rates. However, the Natural Gas Act of 1938 was much more stringent in that it treated interstate gas pipelines more as public utilities, on the general grounds that a gas pipeline was, in effect, a franchise, and a sole source of supply to the gas distribution system. Under the Act, the Federal Power Commission was given authority to approve interstate pipelines on the basis of cost of service and a limiting return on investment. War powers relating to national security, except during World Wars I and II, were exercised in terms of limiting imports–again an overabundance philosophy–and the creation of naval petroleum reserves.

The Federal Power Commission did not regulate direct pipeline sales, or interfere with local distribution systems, nor did it affect intrastate pipelines.

A major change took place in 1954 in the now-famous *Phillips v. Wisconsin* case. The Supreme Court not only ruled, but also mandated, federal control of natural gas prices at the wellhead for sale to interstate pipelines, again using the public utility concept of cost of finding and production as a basis of price. This led to an era of cheap natural gas and its profligate use.

Following the Arab embargo in 1973, the Emergency Petroleum Allocation Act was signed into law under the authority of the interstate commerce clause. Allocation of crude oil and refinery products followed, along with a complex pricing system. The influence of the federal government is now pervasive. These changes have taken place because of transition from domestic overabundance to scarcity. Conservation was foremost in the mind of President Carter when he proposed amendments to the Natural Gas Act that used virtually every constitutional authority of the federal government, including war powers, taxing and spending, taking of property, and extension of the interstate commerce clause to intrastate matters that affect interstate commerce.

Convergence of Public Policy

The common characteristics of groundwater and oil and gas remain concealment below the surface of the land in the little spaces between other things, their fugacious nature, and the special skills required in exploration, drilling, and production. Similar early legal concepts include impairment with respect to groundwater, and correlative property rights with respect to oil and gas. But policy began with different concepts of ownership, and different public policies based on scarcity and overabundance. Among the other differences, not already discussed, are use of groundwater at the point of capture and little resale of groundwater. However, convergence is taking place at a rapid rate in an environment of scarcity for both groundwater and oil and gas. Examples of this convergence are management of a common source of supply by unitization for oil and gas, and by groundwater management districts for groundwater; depletion allowance for both; production and severance taxes for both; concern for conservation; and concern for the environment. One sees convergence in the linkages of groundwater and oil and gas. Declining water tables require more and more energy for the lifting of groundwater for irrigation purposes, and the pumps are driven by oil and gas which are in short supply. Finally, convergence is taking place in the extension of the authority of the federal government, and in the erosion of the authority of states. This trend is of concern, for there is evidence of the inability of the federal government to manage any large system well, let alone discern local public interest and articulate this interest in terms of public policy. Mark Russell has said that reorganizing the federal government for greater responsiveness is like painting racing stripes on an arthritic camel. Even if Russell is only partly correct, responsible state leadership is greatly needed to reverse this erosion of the state's authority to manage its own resources.

DISCOVERIES BRIGHTEN SOUTHEAST UTAH EXPLORATION PICTURE

Wexpro, exploration subsidiary of Mountain Fuel Supply Company, recovered oil at a 67 barrel per hour rate with a flow of 6.5 million cubic feet of gas per day at its no. 1 Bug wildcat, NE SE section 12, T. 36 S., R. 25 E., San Juan County. Flow was from Desert Creek Zone of the Paradox Formation (Pennsylvanian) at 6,297 to 6,333 feet. This apparent discovery follows another discovery in the Desert Creek by McCulloch Oil and Gas in SE NE section 19, T. 28 S., R. 26 E., about 14 miles to the south. The Wexpro discovery is 20 miles east of Blanding and 4 miles west of the Utah-Colorado boundary.

THRUST BELT DISCOVERY

(continued from page 1)

Wyoming. However, the trend may now shift back to Utah.

The Amoco discovery, as yet unnamed, has about 640 feet of very porous sandstone pay, and there is indication that the productive area may continue across the undrilled area to the southwest toward Anschutz Ranch. At least three new drilling locations have been announced in the area in early January.

NEED AIRPHOTOS, SPACE IMAGERY?

The UGMS, a National Cartographic Information Center affiliate, now has complete nationwide listings of LANDSAT imagery, available SKYLAB imagery, and NASA photography.

In addition, we can research availability of all air photography for your area of interest, including photographs by more than 30 Federal agencies, many State agencies, and commercial firms.

Call (801) 581-6831 for more information. Order forms are available at the UGMS library.

DIGGIN'S

REVENUES FROM FEDERAL LANDS

Utah received $12,769,627 in 1979 from mineral receipts from federal lands. States receive 50 percent of revenues from public lands; the BLM Reclamation fund gets 40 percent, and the other 10 percent goes into the U. S. general funds.
from BLM Utah News Digest 12-18-79

EXPENSIVE ARTIFACTS

A new law provides stiff penalties for illegally excavating, removing, transporting, or selling cultural resources from public lands. Fines may be up to $20,000 and two years imprisonment for a first offense, and up to $100,000 and five years imprisonment for a second. Collecting arrowheads is still illegal under the Antiquities Act of 1906.
from BLM Utah News Digest 12-18-79

FEDERAL COAL MANAGEMENT PROGRAM

Responsibilities and procedures for implementing the Department of Interior's new federal coal management program are spelled out in a 43-page booklet available from the Bureau of Land Management, Utah state office, 136 East South Temple, Salt Lake City, Utah 84111.

KENNECOTT COPPER PROGRAM

The Utah Copper Division of Kennecott Minerals has spent hundreds of millions of dollars to control plant emissions, clarify the air, cleanse the water and renew vegetation in the semi-arid Oquirrh Mountain Range. "Our Environment", a booklet published by UCD, explains the $280 million modification of its smelter near Salt Lake City. A new vessel to capture sulfur has been added, as well as a new acid plant and a $3.5 million treatment plant for clarifying waste water.
from American Mining Congress, no. 2-80

ALASKAN OIL MAY TRAVEL THROUGH UTAH

Grand Valley Pipeline is planning a new route to carry Alaskan oil from the Four Corners in Arizona through Utah to Colorado's Rangely field. The oil flows to Four Corners from Los Angeles, and will be sent on to Chicago. Grand Valley Pipeline has nearly completed the economic studies and is ready for a second phase environmental study.

The venture will require construction of about 150 miles of new 16-inch line with a capacity of about 55,000 bbls daily. The line would join the ARCO pipeline near the Four Corners and connect with the Chevron USA line near the Rangely field. An existing and nearly unused line between Lisbon field, near Moab in southeast Utah, and the Four Corners would be reactivated and reversed to cover part of the distance. Most of the new construction will be in Utah.

GIANT GAS PROCESSING PLANT PLANNED

Construction of a $100 million dollar natural gas processing plant near the Whitney Canyon gas field north of Evanston, Wyoming will open a large new market for processed gas from Utah fields. The plant, designed to process 250 million cubic of gas daily, will also produce large amounts of natural gas liquids and about 1200 tons of sulfur daily, the latter from sour gas discovered recently in the Thrust Belt of northern Utah and southwest Wyoming. Much of the sweet, dry gas from the giant plant will reach Chicago and other eastern cities via the 842-mile Trailblazer Pipeline system now partially built. Construction of the plant will begin early in 1980 with operation scheduled to start in January 1982.

BARRELS AND BARRELS

The standard water barrel contains 31½ gallons, petroleum 42 gallons, and wine 32 gallons.

BLM ACCELERATES WILDERNESS INVENTORY IN OVERTHRUST BELT

The 11.4 million acres of public land in the Rocky Mountain Overthrust Belt are expected to be inventoried by the Bureau of Land Management by February, 1980. Eight million of these acres have already been released and two million more have been proposed for release. 400,000 acres have been identified as wilderness study areas and one million acres have been proposed for wilderness study.

The BLM is not only accelerating the inventory of land in the Overthrust Belt, to reduce conflicts with such uses as oil and gas exploration and development, but it has issued a new version of its interim management policy. New oil, gas and mineral exploration on public lands may continue until the classification decisions are made (October 1, 1980), but all temporary disturbance of the surface must be reclaimed. Mineral uses that existed prior to October 21, 1976 may continue if they are in the exploration or development phase. These operations may be expanded if the added disturbances are not significantly different from those existing in 1976. Also, mining claims on which a valid discovery was made before October 21, 1976 may be fully developed.
from Engineering and Mining Journal, January, 1980

ALTON COAL FIELD UNSUITABLE?

Environmental groups, including the Environmental Defense Fund, Friends of the Earth, and the Sierra Club Legal Defense Fund, are seeking to have the Alton coal field designated as unsuitable for surface mining under the Coal Surface Mining and Reclamation Act of 1977. This is believed to be the first such study petition filed by "citizen groups".
from American Mining Congress No. 2-80

INVENTORY OF UTAH'S ENERGY RESOURCES
January 1, 1980

Column	1	2	3	4	5
Resource	Estimate of Reserve or Resource (Gross) Year First Produced	Estimate of Total Production to End of 1979	Total Remaining of Reserve (Percent)	Estimate % Recoverable (of Col. 3)	Possible Additional Resource (Inferred/ Speculative Category)
Coal	24.00 billion short tons 1850 (1) 1870 (2) Resource-Gross	0.40 billion short tons (396 million short tons)	23.60 billion short tons (98.4%)	(4)	15.00 billion sht. tons (3)
Oil & Natural Gas Liquids	915,000,000 barrels 1907 Reserve	690,000,000 barrels	225.000,000 barrels (25%)	Near 100%	250-300 million barrels
Natural Gas	3.10 trillion cu. ft. 1895 (1) 1928 (2) Reserve	1.80 trillion cu. ft.	1.30 trillion cu. ft. (7) (42%)	85-90%	0.850 to 0.900 trillion cu. ft. (850 to 900 bill. cu. ft.)
Oil-impregnated sandstone	26.00 billion barrels of oil in place No production Resource-Gross	None	26.00 billion barrels of oil in place (100%)	15-20%	1.5 - 2.0 billion barrels
Uranium	35.0 million short tons (5) Reserve	18.7 million short tons	16.3 million short tons (5) (47%)	(4)	No estimate
Oil Shale	120 billion barrels (6) 1977 Resource-Gross	8,400 bbls.	120 billion barrels (6) (100%)	35 - 40%	

(1) Approximate first production.
(2) First records kept.
(3) Under less than 3,000 ft. of cover.
(4) No estimate of % recoverable
(5) 0.26% grade (approximate)
(6) 25+ gallons per ton grade, 10 or more feet thick
(7) Includes reserves of sour gas and gas in tight sands and gas being used in pressure maintenance and secondary recovery operations most of which will become producible in future.

CLEARINGHOUSE REVIEWS GRANTS AND PROPOSALS FOR STATE OF UTAH

A/95 State Clearinghouse is the basic center for review and final approval of about two thirds of all applications for federal grant-in-aid funds, which in 1979 comprised about 20 percent of the entire state budget, or more than $255,291,108.

The Clearinghouse also comments on a variety of inter-government proposals, including environmental impact statement proposals, public notices, and federal actions impacting on Utah. Its purpose is to protect the interests of the State. The basic functional arms of the A/95 review process are two committees, the Environmental and the Human Resources Coordinating Committees.

Representing UGMS at the bimonthly Environmental Coordinating Committee meetings is Bruce N. Kaliser, Chief Engineering Geologist. Every significant proposal that impacts on the State of Utah, from the MX missile (U. S. Air Force) to the Intermountain Power Project and down to community culinary and wastewater facilities is considered.

Agenda items likely to trigger the interest of UGMS include sites for public facilities, waste disposal, groundwater development, proposals for restricting access to mineral lands, land exchanges, energy resource developments and overall environmental reviews for proposed land use modification.

In 1979, ECC reviewed over 1300 proposals. Comments were furnished by the Committee on about 20% of the items. The Committee members review proposals according to criteria of possible duplication of services, conformance with State and local goals and objectives, potential wastefulness, administrative competence, and the public interest.

PLATEAU RESOURCES BUILDING TWO URANIUM MILLS

Plateau Resources expects to have its uranium mine and 247 stpd mill in Garfield County, Utah, ready for production of uranium oxide in the latter part of 1980.

Plateau had been buying uranium ore at Blanding, Utah, and stockpiling it for processing in a second mill, 750-stpd capacity, being built about 16 miles north of Bullfrog Basin. The buying station is now closed; the company has developed a mine near the mill in Shootaring Canyon, and is building a community at Tickaboo to accommodate the families of 250 mine and mill workers who will operate the new facilities. The uranium oxide produced by the mill will be used at two 88-Mw facilities being constructed near Midland, Michigan, by Plateau's parent company, Consumers Power Company.

Publications – Old and New

BIBLIOGRAPHIES OF UTAH GEOLOGY UP TO DATE

The UGMS has published a series of bibliographies of Utah geology to keep geologists up to date with what's happening in Utah. These publications are:

Bibliography of Utah Geology to December 31, 1950, Bulletin 40 (August 1951) by Walter R. Buss, $4.00 (over the counter).

Bibliography of Utah Geology 1950 to 1970, Bulletin 103 (June 1974) by W. R. Buss and N. S. Goeltz, $6.50 (over the counter).

Since the publication of Bulletin 103, annual bibliographies have been published as follows:

1970 - UGMS *Quarterly Review*, vol. 5/2, May 1971
1971 - UGMS *Quarterly Review*, vol. 6/2, May 1972
1972 - UGMS *Quarterly Review*, vol. 7/2, May 1973
1973 - *Utah Geology*, vol. 1/1, Fall 1974
1974 - *Utah Geology*, vol. 2/2, Fall 1975
1975 - *Utah Geology*, vol. 3/2, Fall 1976
1976 - *Utah Geology*, vol. 4/2, Fall 1977
1977 - *Utah Geology* vol. 5/2, Fall 1978, (also published as UGMS Circular 60, $1.00 over the counter)
1978 - UGMS Circular 61, $1.00 (over the counter)

These are available for consultation at the UGMS Library, 606 Black Hawk Way, Research Park, Salt Lake City, Utah and at various libraries in Utah and elsewhere in the United States. A working compilation of the 1970-1978 bibliographies is also available at the UGMS Library.

The 1979 bibliography will be published as a circular in 1980, and the ten-year compilation, 1970 through 1979, will be published as a bulletin as soon as possible in 1980 or early 1981. If our readers have found any errors on omissions in the earlier bibliographies, we would like to know before we publish the final edition.

A bibliography of the Oil-Impregnated Rock Deposits of Utah by Howard R. Ritzma and Jock A. Campbell, has recently been published as UGMS Circular 64, $1.00 (over the counter).

All bibliographies listed for sale can be purchased over the counter or by mail from Publication Sales, UGMS, 606 Black Hawk Way, Salt Lake City, Utah 84108. Prepayment is required for mail orders. There is a 10% charge for mailing, with a minimum charge of $.75.

For additional information contact: Utah Geological and Mineral Survey, Geologic Editor or Publication Sales.

NEW PUBLICATIONS NOW AVAILABLE AT UGMS SALES OFFICE

UGMS Circular 64, Bibliography of Oil-Impregnated Rock Deposits of Utah, by Howard R. Ritzma and Jock A. Campbell, 17 p., with map, $1.00 over the counter, $1.75 by mail, prepaid.

UGMS Map 50, Active Oil Shale Operations, Eastern Uinta Basin, compiled by H. R. Ritzma, scale 1:16,000, $2.00 over the counter, $2.75 by mail prepaid.

Quaternary Fault Map of Utah, compiled by Larry W. Anderson and Darryl G. Miller, Fugro, Inc., scale 1:500,000, $5.20 over the counter, $5.95 by mail, prepaid.

Earthquake Studies in Utah, 1850-1978, edited by Walter J. Arabasz, Robert B. Smith, and William D. Richins, University of Utah Seismograph Stations, Department of Geology and Geophysics, University of Utah, 550 p., provides a basic explanation of earthquakes and seismic activity as well as the history of earthquake activity and research in Utah. $11.82 over the counter; $13.00 by mail, prepaid.

BOOK ON GREAT SALT LAKE NEARS COMPLETION

"The Great Salt Lake – a scientific, historical and economic overview," is to be published as UGMS Bulletin No. 116. It will be a compilation of 36 papers about the lake and its environs, and will be broken down into seven sections: History and Recreation; Geology and Geophysics; Chemistry; Lake Industries; Hydrology and Climatology; Biology, and Engineering. A collection of color photographs depicting the beauty of the lake is tentatively planned.

The papers have been written by experts in many fields, and the book is a sum of our knowledge of Great Salt Lake at the present time. Some articles are highly technical but others are of general interest.

STAFF CHANGES

Since the last issue of Survey Notes, the following persons have joined UGMS:

Carolyn Olson is new secretary in Urban and Engineering Geology section.

Another recent addition to the UGMS staff is Mage Yonetani, who has worked at the publications sales desk since late last summer.

The Economic Geology section has added Brice Tripp as geologist. Brice comes to us from the University of Utah and Terra Tek.

UGMS has lost the services of the following members of its professional staff:

Robert Klauk, geologist in Urban and Engineering Geology section, to Chen & Associates, geological consulting firm; Carlton Stowe, information specialist, to Longhorn Oil and Gas as regional manager in Salt Lake City; Ralph Stegen, geologic technician in Economic Geology section, to Noranda Exploration as mine geologist in Park City; and Lee Perry, geologist in Economic Geology section, to a mining exploration firm in Salt Lake City.

UGMS wishes our "graduates" well in their new professional associations and business ventures.

EARTHQUAKES IN UTAH

Two earthquakes were felt in Cache County in the Logan area in January. The first, on Sunday, January 6 at 2:47 p. m., measured 2.6 on the Richter scale; the second, on Thursday, January 10 at 12:01 p. m., measured 2.8. The epicenter is placed seven miles east of Logan. No reports of injury or property damage were received.

KBOW radio received three telephone calls. The quake was described as a jolt lasting about one second.

In Logan, Dr. Winn Carter felt the Sunday event as he was seated in his home at 1757 East 1080 North. He described it as a sharp jolt. The windows rattled and there was structural noise but the light fixtures did not move.

Dr. Fred Keefer felt the Thursday event as he was seated in a swivel chair in his office on the second floor of the Engineering building at Utah State University. He described it as one sharp shock with a few additional vibrations lasting about three seconds or less. The door rattled about six times after the initial shock.

WHO PAYS FOR EARTHQUAKE DAMAGE?

Increasing numbers of courts are holding governmental bodies responsible for damages suffered by persons in natural disasters. So what about earthquakes? A recent study made by the Association of Bay Area Governments, in California, found that while an earthquake is considered an "act of God", its effects on buildings and people are foreseeable and preventable due to advances in structural engineering, improved information about risk zones, and the development of earthquake prediction capability. Therefore, local governments are responsible for developing and implementing stratagies to minimize damage, for maintaining an inspection program for public property, for enforcing building codes, and seeing that the policy makers and administrative officials are aware of their responsibility.

from Natural Hazards Observer, vol. IV, no. 2, 12-79

GEOTHERMAL DEVELOPMENTS IN UTAH

GEOPHYSICAL SURVEYS

Aerial Geophysics, a Salt Lake corporation under contract with the UGMS, has completed two aerial magnetic surveys in the vicinity of Crystal Hot Springs (near the state prison) and at Utah Hot Springs (near North Ogden). They have also completed four gravity surveys; two at the above sites, one at Crystal (Madsen) Hot Springs (near Honeyville) and one at Udy Hot Springs (near Plymouth). The reduced geophysical data for the six surveys are expected by mid-February.

UTAH ROSES DRILLS WELLS

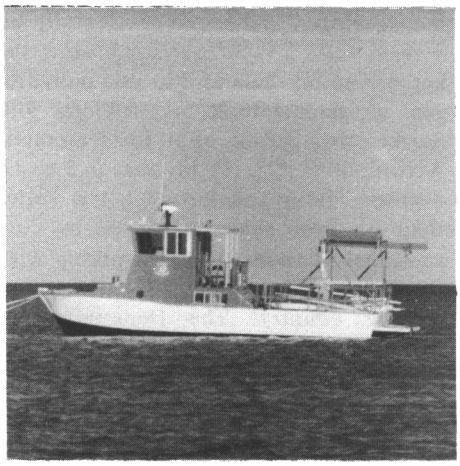
Utah Roses of Sandy, Utah, has completed two geothermal production wells (see Survey Notes, November, 1979). The first well, completed at Crystal Hot Springs near the state prison, was drilled to a depth of 410 feet. After completion, it had an artesian flow of 150 gpm at a temperature of 190°F. The water temperature at the bottom of the well was about 198°F. The second well, drilled by Utah Roses was located at their present greenhouse complex in Sandy. The well was drilled to a depth of 5024 feet. The well has an artesian flow of 10 gpm at a temperature of 122°F. Greater production is expected when the well is pumped. The cost of this well was financed by the U. S. Department of Energy under the Project Opportunity Notice (PON) program. The intended use for both of the Utah Roses wells is to heat green houses.

ALCOHOL USES THERMAL WATER

Geothermal energy will be used to produce alcohol from sugar beets at a facility to be constructed near Cove Fort, Utah. The plant will produce 7 million gallons each year to be sold to petroleum refineries within the state. According to Mr. Robert Helber of Rand R. Energies, plant operators, construction will begin in July with production expected by December. The geothermal fluids to be used in the project will be supplied by Frominco Inc. of Beaver, Utah, from well 42-7 and will be reinjected into well 31-33. Both of these wells were drilled by Union Oil Co., but were recently turned over to Forminco when Union dropped its leases at the Cove Fort KGRA. Water temperature at the well head is expected to be approximately 165°C (330°F). After being used in alcohol production, the hot water may be further used in a greenhouse or fish farm before reinjection.

DOE/DGE MEETING HELD

The annual U. S. Department of Energy – DOE/DGE Resource Assessment/Commercialization planning meetings were held in Salt Lake City on January 22-24. Speakers from both the resource teams and the planning teams, principally from the sixteen western states and Hawaii, discussed their respective work programs. In addition, work shops and tours were held. A preliminary copy of Utah's energy resources map was displayed by NOAA.



THE G. K. GILBERT TAKES ON NEW LIFE

The G. K. Gilbert, transferred from the jurisdiction of the Utah Geological and Mineral Survey to the Utah Division of Parks and Recreation last January, was returned to Great Salt Lake last August. The boat has been reconditioned and cleaned; most of the work was done by three young people from the federally funded Young Adult Conservation Corp.

The UGMS purchased the 16 ton, 42 foot boat in 1965 and used it as a research craft for geological and geophysical studies of the structure of the lake.

NEW OIL-SHALE RECOVERY TECHNIQUES BEING TESTED

Two new techniques for recovering liquid petroleum products from oil shale are being tested.

One, now being tested in the Uinta Basin by Texaco Inc., Raytheon Co., and the Badger Co. Inc., uses radio-frequency electric fields to heat the deposits in place (see Survey Notes vol. 13, no. 4, p. 3). No mining is required; land surface is not disturbed, and there is no waste disposal problem. Water use is minimal, an important factor in the arid west. If successful, this process could open up for economic production oil shale reserves containing more than 1 trillion barrels of oil – equivalent to more than 150 year's supply at the present rate of consumption.

The Institute of Gas Technology, a private research group based in Chicago, has developed and tested successfully on a small scale a technique for heating the kerogen in oil shale at 250 psia in hydrogen at temperatures of 700 to 900 degrees, over periods of 10 to 15 minutes. According to IGT the product is 5 to 10 degrees lighter and has 30% less sulfur than oil from shales produced by conventional methods. IGT is working with Devonian shales from the eastern part of the country. The Department of Energy has awarded a $2.6 million contract to IGT to develop a 2000 stpd pilot facility.

IN MEMORIAM
Quey C. Hebrew, 1922-1980

Quey Hebrew, well known petroleum geologist and consultant, died January 14 in Salt Lake City. He was a resident of Lehi, Utah and maintained consulting offices in Salt Lake City.

A native of New Mexico, Quey was a graduate of Brigham Young University with a B. S. and M. S. in geology. He was employed as a geologist by the U. S. Corps of Engineers and Shell Oil Company. Although his employment took him to many parts of the world, he maintained close ties and interest in Utah and the western U. S.

Quey was a member of Sigma Gamma Epsilon geological fraternity at B. Y. U. and was an active member of the Utah Geological Association, the American Association of Petroleum Geologists, and the American Institute of Professional Geologists. He was president of the Utah section of A. I. P. G. in 1977.

FISH SPRINGS RANGE

This 18 mile-long range in western Juab County rises to 8,523 feet. There is not an officially named peak, canyon or drainage in the entire range.

LAKE BEGINS ANNUAL RISE

Gage heights (in feet) recorded by the U. S. Geological Survey are:

		Boat Harbor (South Arm)	Saline (North Arm)
Nov.	1, 1979	4197.60	4196.60
	15	4197.55	4196.60
Dec.	1	4197.60	4196.55
	15	4197.65	4196.60
Jan.	1, 1980	4197.70	4196.65
	15	4197.85	4196.85

After a gradual increase from the low point of mid-October at 4197.50, levels showed an abrupt rise shortly after wet weather began in early January. The mid-January level was 0.9 foot lower than that on the same date in 1979. The level in mid-October 1979 was the lowest recorded since October 1971.

UTAH GEOLOGICAL AND MINERAL SURVEY
SURVEY NOTES

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Editorial Staff. . . . . .Wilma A. Boone and
Bonnie Barker

State of Utah--Department of Natural Resources
UTAH GEOLOGICAL AND MINERAL SURVEY
606 Black Hawk Way
Salt Lake City, Utah 84108

Address Correction Requested

Appropriations No. 01-61-03
Archives Approval No. 8000063